

# Notice of Allowability

Application No.

09/997,645

Examiner

Mussa A Shaawat

Applicant(s)

HARWOOD, ERIC

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/29/2001.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☒ The drawings filed on 29 November 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 11/3/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### **DETAILED ACTION**

1. This action is responsive to application # 09/997,645. Claims 1-8 are pending for examination.
2. Claims 1-8 are allowed.
3. Pursuant to 37 C.F.R. 1.109 and M.P.E.P. 1302.14, the following is an examiner's statement of reasons for allowance:

The prior art of record fails to teach neither singly or in combination the claimed limitation of "digitally projecting a two-dimensional point cloud onto the intersecting flat surfaces; smoothing intersections (see specification Paragraph [0033], et-seq) of the panels between the points of the projected point cloud to define curves with a bend radius substantially equal to distances between the points of the point cloud for defining an optimal manufacturable shape (see specification Paragraph [0033], et-seq) for exhaust muffler" in claims 1-8.

The closest prior art of record Myer kutze "Mechanical Engineer's Handbook" referred to hereinafter as kutze, teaches meshes generated on a three dimensional surface and the deformation of a metal beam. However Kutze fails to teach eliminating resonance frequencies or natural frequencies after performing three dimensional mesh analysis of the initial shape of the exhaust system component in order to eliminate the noise coming out of the exhaust component.

Another closest prior of record Ciray Sam "Dynamic Analysis & Correlation for Exhaust System" referred to hereinafter as Sam, teaches the use of MSC.Nastran normal modal analysis to identify the natural frequency or the resonance frequency of

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the exhaust system. However, Sam fails to teach converting the initial shape of the exhaust system component to a three dimensional mesh, and deforming the three dimensional to define an optimal theoretical shape for the exhaust system component.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Examiner's Amendment***

4. The abstract is being amended in the following page. Please replace the abstract with

***Abstract of the Disclosure***

\_\_ A method is provided for designing deformations that will achieve an optimum reduction in vibration related noise in an exhaust system component. The method [comprises] entails defining an initial shape for an exhaust system component based on available space and exhaust flow characteristics. The shape is converted to a mesh having a plurality of interconnected grids. The mesh then is deformed to define an optimal theoretical configuration for the exhaust system component that will eliminate at least selected natural frequencies. The resulting shape then is converted to a plurality of small flat surfaces that intersect, and a point cloud is created from the array of small flat intersecting surfaces of the optimal theoretical exhaust system component. The point cloud is employed to smooth out intersecting surfaces and to achieve an optimal manufacturable configuration for the exhaust system component. \_\_

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Falkowski et al. US Patent No. (5,949,989) Method of designing and developing engine induction systems, which minimize engine source noise.
- Bremner et al US Patent No. (6,090,147) Computer program media, method and system for vibration and acoustic analysis of complex structural-acoustic systems.
- Kobayashi US Pub. No. (us 2002/0061110) Actively-controlled sound absorption panel system using movement-controlled reflective plate.
- Akaike et al. US Patent No. (6,668,206) Method apparatus and memory medium for supporting product development.
- Uegane et al. US Pub. No. (US 2001/0035155) Vehicle Engine Exhaust system.
- Uegane US Pub. No. (US 2001/0018995) Exhaust Muffler.
- Uegane US Patent No. (6,554,099) Exhaust Muffler.
- Rao et al. US Pub. No. (US 2003/0211020) Noise attenuating emission converter.
- Allard US Patent No. (4,516,657) Sound suppression of engine noise.
- Marocco US Pub. No. (US 2004/0050618) Exhaust sound and emission control systems.
- Naito US Pub. No. (US 2002/0088667) Engine muffler and method of manufacturing the same.

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- Xitian (steve) Fang, Ciray Sam, "Dynamic Analysis & Correlation for Exhaust System", 9/22/2000, PDF file, Pages 1-9.
- Jianbing Huang and Chia-Hsiang Menq, "Automatic Data Segmentation for geometric Feature Extraction From Unorganized 3-D Coordinate Points", IEEE Transactions, vol. 17, NO. 3, June 2001, Pages 268-279.
- Ahmed El-Bahrawy, Mattias Nystrom, "Automated Integrated finite Element Analysis Using MSC.Nastran and SDRC/I-DEAS", Lulea University of Technology Volvo Car Corporation, September 22, 2000.
- O.Bailly, C.Buchou, A. Floch and L. Sainsaulieu, "Simulation of the Intake and Compression Strokes of a Motored 4-Valve SI Engine with a Finite Element Code" Oil & Science and Technology-Rev. IFP, Vol. 54 (1999), No. 2, Pages 161-168, Editions Technip.
- Hisashi Sano, toshio Inoue, Akira Takahashi, Kenichi Terai, and Yoshio Nakamura, "Active Control System for Low-Frequency Road Noise Combined with an Audio System", IEEE Transactions, Vol. 9, No. 7, October 2001, Pages 755-763.
- Myer Kutz, "Mechanical Engineers Handbook", Copyright 1998 by John Wiley & Sons, Pages 276-285, and Pages 311-318.
- Don D. Davis, Jr. George M. Stokes Dewey Moore George L. Stevens, Jr., "Theoretical and experimental Investigation of Mufflers with Comment on Engine-Exhaust Muffler Design", 1954, Pages 1-6.

***Communication***


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mussa A Shaawat whose telephone number is (571) 272-3785. The examiner can normally be reached on Monday-Friday (8:30am to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean R Homere can be reached on (571) 272-3780. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application should be directed to the **TC 2100 Group receptionist: 571-272-2100**.

Mussa Shaawat  
Patent Examiner  
March 16, 2005

  
JEAN R HOMERE  
PRIMARY EXAMINER